NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

THE ECONOMICS OF THE COMMODITY MARKET OPERATIONS

by

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June 1986

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CURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

a REPORT SECURITY CLASSIFICATION
UNCLASSIFIED

1b. RESTRICTIVE MARKINGS

a SECURITY CLASSIFICATION AUTHORITY

b DECLASSIFICATION / DOWNGRADING SCHEDULE

3 DISTRIBUTION / AVAILABILITY OF REPORT
Approved for public release; distribution is unlimited.

PERFORMING ORGANIZATION REPORT NUMBER(S)

5 MONITORING ORGANIZATION REPORT NUMBER(S)

a NAME OF PERFORMING ORGANIZATION
Naval Postgraduate School

6b OFFICE SYMBOL (If applicable)
Code 54

7a NAME OF MONITORING ORGANIZATION
Naval Postgraduate School

c. ADDRESS (City, State, and ZIP Code)
Monterey, California 93943-5000

7b ADDRESS (City, State, and ZIP Code)
Monterey, California 93943-5000

a NAME OF FUNDING / SPONSORING ORGANIZATION

8b OFFICE SYMBOL (If applicable)

9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER

c ADDRESS (City, State, and ZIP Code)

10 SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO	PROJECT NO	TASK NO	WORK UNIT ACCESSION NO

1 TITLE (Include Security Classification)
THE ECONOMICS OF THE COMMODITY MARKET OPERATIONS

2 PERSONAL AUTHOR(S)
Randolph, John W., Jr.

13a TYPE OF REPORT	13b TIME COVERED FROM _____ TO _____	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
Master's Thesis		1986 June	57

6 SUPPLEMENTARY NOTATION

7 COSATI CODES		
FIELD	GROUP	SUB-GROUP

18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
commodities, commodity market, futures market, commodity exchange, futures exchange

9 ABSTRACT (Continue on reverse if necessary and identify by block number) Many organizations in the private and public sector, rely on commodities for inputs to their production processes. To provide the needed organizational structure for the purchasing and selling of these commodities formal commodity markets were established. This study investigates the different functions of the futures market organization as well as their behavior and performance. The focus is on the development of futures markets for a small range of commercial transactions. The market, because of its volatity is, overall, extremely risky. The future market organization not only permits a transfer of risk but also results in less total risk to society. Resulting from the reduced risk in the aggregate, larger amounts of production and inventory carryover are undertaken. A thorough understanding of the market organization and the causes for price movements are advised prior to entering into a transaction.

0 DISTRIBUTION / AVAILABILITY OF ABSTRACT
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS

21 ABSTRACT SECURITY CLASSIFICATION
UNCLASSIFIED

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D FORM 1473, 84 MAR

83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

Approved for public release, distribution unlimited

The Economics of the Commodity Market Operations

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1986

ABSTRACT

Many organizations in the private and public sector, rely on commodities for inputs to their production processes. To provide the needed organizational structure for the purchasing and selling of these commodities formal commodity markets were established. This study investigates the different functions of the futures market organization as well as their behavior and performance. The focus is on the development of futures markets for a small range of commercial transactions. The market, because of its volatity is, overall, extremely risky. The future market organization not only permits a transfer of risk but also results in less total risk to society. Resulting from the reduced risk in the aggregate, larger amounts of production and inventory carryover are undertaken. A thorough understanding of the market organization and the causes for price movements are advised prior to entering into a transaction.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

A. BACKGROUND AND OBJECTIVE

Webster defines a commodity as something useful or valuable, an economic good, an article of commerce. Many organizations, both, in the private and public sectors rely on these commodities in the form of raw materials for inputs to their production processes. To provide the needed organizational structure for the purchasing and selling of these commodities formal commodity exchanges were established.

The prices of commodities are affected by a number of factors, many of which are not controllable or predictable. These could result in very volatile price behavior. Commodity prices are even affected by which way the wind blows, as evidenced by the Chernobyl's nuclear accident. This illustrates the volatile environment controlling market outcomes.

The element of risk is a major factor influencing whether or not an individual should buy or sell commodities in anticipation of their use, or whether he should wait until the commodities are actually needed and possibly pay a much higher price. The result of these risks is a direct cause of the volatile price movements experienced by many commodities.

The purpose of this study is to investigate the different functions of the futures market organization as well as their behavior and performance. The focus will be on the development of these functions in the futures markets for a small range of commercial transactions.

B. THE RESEARCH QUESTION

The primary research question this study will attempt to answer is how does the existence of a futures market affect market performance? Resulting from the primary question, three subsequent questions will be answered are:

- The first is how is the futures market organized and why?
- The next question is what are the various factors that affect the market?
- How can unforeseen events affect the market?

C. LITERATURE REVIEW AND METHODOLOGY

Information was obtained from a number of different sources. Preliminary research included a review of a wide range of periodicals, magazines and newspapers. This literature was obtained from the Naval Postgraduate School Library, the Defense Logistics Studies Information Exchange (DLSIE), textbooks, interviews with faculty and students at the Naval Postgraduate School, and discussions with individuals at the different futures exchanges in the United States.

The methodology used to analyze wheat futures, in Chapter V, was to compare the futures price with that of the spot price. The data for the analysis reflects only the last trading day for each month from January 1982 through April 1986. Wheat was used for two reasons. First, wheat is a very active seasonal commodity that typifies the characteristics of the futures market. Secondly, to the recent nuclear incident in Chernobyl, will show just how volatile futures markets can be.

D. ORGANIZATION OF THE RESEARCH

This study is divided into six chapters. In this chapter, the objective of the study has been set forth and the direction of the effort identified and presented. Chapter II provides a brief history of the futures markets in the United States. Chapter III provides an overview of the pricing mechanism within the market and discusses various factors which control prices. Chapter IV explores the risk associated with the purchasing, holding and selling of commodities. Chapter V analyzes the past and present performance of the futures market with emphasis on the effects that the recent nuclear incident in Russia had on the wheat futures market. Chapter VI sets forth the summary and conclusions.

E. SUMMARY OF FINDINGS

The results of this study show that the market performance is affected by numerous inputs that are uncontrollable and unpredictable. These inputs, which affect the spot and futures prices for commodities, create the risk environment in which the market operates. The purpose of this study was to investigate the different functions of the futures market organization as well as its behavior and performance.

II. FUTURES MARKETS IN THE UNITED STATES

A. INTRODUCTION

This Chapter discusses a number of topics that are essential to understanding futures markets in the United States. First, this chapter will explore the origins of futures markets. Understanding these origins helps in comprehending the usefulness of these markets, as well as the stages in their development. After a brief history, the following section will discuss the use of forward markets, which were used for centuries prior to establishment of the futures markets. Knowledge of the differences between these two types of markets is important in order to understand the techniques that can be applied to futures trading today. The organizational structure of the futures market is explored next. It is important to understand the organizational forms of the futures exchanges and the types of contracts traded. The final section of this chapter is devoted to a discussion of the purposes the futures markets serve and also the principle market participants.

B. THE ORIGIN OF THE FUTURES MARKET

The trading of commodities has characterized civilization since its earliest periods. The development of modern trading practices can be traced to medieval Europe, where by the tenth century, trading activity on a large scale could be found. From the eleventh to the fourteenth centuries, the number and quantity of commodities traded increased rapidly. This increase in trading can be linked to medieval fairs. [Ref. 1: p. 4] These fairs, usually

lasting a month or two, were organized to function on a regular basis and were located in different towns throughout the year. Merchants, from different countries, set up their shops at these fairs to sell their products. The price received for a good was determined by the supply and demand for the product. At these fairs, farmers in the area would bring in their excess crops where they could be sold. Because the crops were seasonal in nature, an excess supply could result in the consumers receiving a very low price. Since few storage capabilities existed at these markets, surplus crops would have to be sold at a loss or discarded.

By the sixteenth century, the major European trading activity shifted to Amsterdam. As cities began to grow in size and commercial importance, commodity trading began to take place in special markets known as "Bourses" in Europe and "Exchanges" in England. These early markets or exchanges were essentially meeting places where buyers and sellers could trade commodities throughout the year. [Ref. 1: p. 4]

Since these markets were located in many different regions of Europe, one would expect to find large variations in price and availablity of goods. As a result of poor communication and transportation facilities these markets were quite local in character and could be interconnected only with substantial time lags and then only imperfectly. The intermarket total supply and demand were equalized very slowly and imperfectly. Thus speculation had to play an important role. This, in turn, discouraged the development of better functioning market signals for guiding and controlling supply decisions and demand.

As economic conditions improved and the volume of trading on the London exchanges increased, dealers began to specialize in the trade of

individual commodities. These dealers, who engaged in spot (current price) and in forward transactions, provided the market with the useful service of risk coverage. The ultimate effects of their activity was that the seller was assured of a buyer at a reasonable price while the purchaser was assured, not only of a favorable price but also, of an acceptable quality.

In the nineteenth century, the various commodity exchanges which emerged in London, Amsterdam, and other cities also began to appear in cities across the United States, including Chicago, New York, New Orleans, St. Louis, and Savannah. Of these, New York was the first to emerge as a major trade center. As trade in commodities increased, the Port of New York assumed greater importance in international trade. Although Chicago did not have an important position with respect to overseas trade, both the new railroads and the canal networks soon made that city a major center of domestic trade as it became feasible for farmers to transport larger harvests to market. Once at the market, however, the farmers were faced with the same problem of selling their entire crop due to lack of storage.

In 1848, eighty-two Chicago businessmen founded the Chicago Board of Trade. Their charter was:

- to maintain a commercial exchange
- to promote uniformity in the customs and usages of merchants
- to indoctrinate principles of equity to trade
- to facilitate the speedy adjustment of business disputes
- to acquire and disseminate valuable commercial and economic information
- generally to secure to its members the benefits of cooperation in the furtherance of their legitimate pursuits. [Ref. 2: p.1]

Since the establishment of the Chicago Board of Trade, the number of futures markets has increased. There are currently thirteen futures exchanges in the United States that deal with over fifty different commodities. They are shown in Table I. The past decade has been a very successful one for the further adoption of futures markets due primarily to the development of new contracts in foreign currencies, interest rates and options.

C. FORWARD VERSUS FUTURES MARKETS

The markets for futures transactions may be forward markets (unorganized)or futures markets (organized). The distinction between forward and futures markets is the difference in the degree of formality of the market's organization.

In early forward markets, buyers and sellers enter into an agreement, the terms of which were tailor-made to their individual circumstances. Delivery to the buyer was usually made by the seller at an agreed future date. The early forward contracts were informal, based on mutual confidence in the fulfillment of the contract by the other party. A simple type of a forward contract can be illustrated by the following example. Having heard that a pedigree dog has just given birth to a litter of pups, you go to look at the pups to try to buy one. After inspecting the pups, you then agree on a price. Since the pup is too young to be weaned, it has been determined that the dog will be available in six weeks. At that time you will pay the agreed price for the pup. [Ref. 3: p. 2]

From the simplicity of the contract and its usefulness in resolving uncertainty about the future, it is not surprising that these types of

TABLE I

FUTURES EXCHANGES IN THE UNITED STATES

Amex Commodities, Corp. (ABC)

GNMA, Mrtges., CD	U.S. Treasury Bills	U.S. Treasury Bonds

Chicago Board of Trade (CBT)

Wheat	Corn	Oats
Soybean	Soybean Oil	Soybean Meal
Silver	Gold	U.S. Treasury Bonds
U.S. Treasury Notes	GNMA (CDR)	Major Market Index
Major Market Index MAXI	Municipal Bond Index	NASDAQ-100 Index

Chicago Mercantile Exchange (CME)

Live Hogs	Live Cattle	Feeder Cattle
Pork Bellies	Lumber	

Commodity Exchange, New York (CMX)

Aluminum	Copper	Silver
Gold		

Chicago Rice and Cotton Exchange (CRCE)

Rice	Cotton

Coffee, Sugar and Cocoa Exchange, New York (CSCE)

Coffee	Sugar, World	Sugar, Domestic
Cocoa	CPI-W, Futures	

New York Cotton Exchange (CTN)

Cotton	Orange Juice (FCOJ)	Propane
European Currency	U.S. Dollar Index	

International Monetary Market at CME, Chicago (IMM)

British Pound	Canadian Dollar	Deutsche Mark
Japanese Yen	French Franc	Swiss Franc
Eurodollar	European Currency Units	U.S. Treasury Bills
Commercial Bank CD	S&P 100 Index	S&P 250 Index
S&P 500 Index		

TABLE I (CONTINUED)

Kansas City Board of Trade (KC)

Wheat, Winter	Value Line Index	Mini Value Line

Midamerica Commodity Exchange (MCE)

Wheat	Corn	Soybeans
Soybean Meal	Live Cattle	Live Hogs
Oats	Platinum	Copper
Silver	Gold	U.S. Treasury Bonds
U.S. Treasury Bills	Swiss Franc	Duetsche Mark
Japanese Yen	Canadian Dollar	British Pound

Minneapolis Grain Exchange (MPLS)

Wheat

New York Futures Exchange (NYFE)

NYSE Composite Index	Future Price Index (first contract month is Sept)

New York Mercantile Exchange (NYM)

Palladium	Platinum	Potatoes
Crude Oil	Heating Oil No. 2	Leaded Reg. Gasoline
Unleaded Gasoline		

contracts have a very long history. Forward contracts continue to be important today in markets for credit and foreign exchanges. The existence of forward markets underlies and is a prerequisite to the establishment of futures markets.

Trading in futures markets consists of the selling and purchasing of a commodity by means of standardized futures contracts. A futures contract is an agreement to buy or sell a certain quantity of a commodity for delivery at a future date for an agreed upon price. As a result of the large volume of

contracts traded, the exchange of futures contracts required a number of key considerations. They were:

- The commodity selected must be easily graded and grading be inspected regularly.
- Payment had to be made at the time of delivery.
- Prices had to be reported openly and everyone given an opportunity to trade at a desired price.
- Buyers and sellers were accepted only if they could satisfy the financial responsibility requirement.
- The number of buyers and sellers had to be sufficiently large to provide continuous opportunities for trade. [Ref. 1: p. 4]

With the passage of time futures markets have emerged as a special kind of forward contract. With their special characteristics of organized exchanges, clearinghouses, financial safeguards, and standardized contracts, futures markets represent a highly improved forward trading procedure, first developed in the nineteenth century.

Futures contracts are necessarily traded only on an organized exchange [Ref. 3: p. 5]. This organized structure for the trading of futures contracts differs from the organization of forward markets. Forward markets are loosely organized and have no physical location devoted to trading. One of the most well developed forward markets is the one for foreign exchange. It is a worldwide network of participants, predominately banks and brokers, who communicate with each other electronically. However, there is no organized exchange and no central trading place.

One of the most important differences between forward and futures markets is that futures exchanges trade only standardized contracts. In a forward contract, the commodity to be traded is not standardized and the time of delivery is an agreement by the two trading parties. Such is not the

case in a futures market. Futures contracts are highly uniform and well specified commitments for a carefully described commodity to be delivered at a certain time and in a certain manner. Another difference is that a forward contract is between a specific buyer and a specific seller. Neither can completely transfer his obligation but must retain some liability for its satisfactory completion. In the futures contract, either party can escape his obligation by an offsetting transaction.

D. EXCHANGE ORGANIZATION

As stated before, futures contracts are always traded on an organized exchange. A list of the exchanges in the United States can be found on Table I. The futures exchange is a voluntary, nonprofit association of its members. Membership, which can be held only by individuals, gives them the right to trade on the exchange, have a voice in the exchange's operation, and regulate the exchange's operations [Ref. 3: p. 3].

According to the rules of the exchange, trading may take place only during the offical hours of the exchange in designated areas called "pits". Futures contracts are traded by a system of "open outcry". In this system, any offer to buy or sell must be made to everyone present. [Ref. 2: p. 6]

To ensure smooth trading in futures, each exchange operates a clearinghouse. The purpose of the clearinghouse is to guarantee performance to all participants in the market. All obligations incurred at the exchange must be settled with the clearinghouse at the end of each day. The clearinghouse takes no active position in the market, but acts as a middleman between both parties to every transaction. [Ref. 3: p. 5]

E. TYPES OF CONTRACTS TRADED

The types of futures contracts traded fall into five categories. The goods traded may be an agricultural or metallurgical commodity, an interest-earning asset, a foreign currency or a stock index.

1. Agricultural

In the agricultural area, contracts are traded in grains, oil and meal, livestock, poultry, forest products, textiles and foodstuffs. For many of these commodities, several different contracts are available for different grades or types. There are also a number of different months for delivery. The months chosen for delivery of seasonal crops generally fit their harvest patterns. The number of contract months available for each commodity also depends on the level of trading activity.

2. Metallurgical

The metallurgical category includes the genuine metals, as well as petroleum products. The metal contracts traded include gold, silver, platinum, palladium and copper. Of the petroleum products only heating oil, crude oil, gasoline and propane are traded on futures markets.

3. Interest Earning

Futures trading on interest-bearing assets began only recently. The growth of this market, however, has been significant. Contracts are traded on Treasury Bills, Notes and Bonds, on Bank Certificates of Deposits, Eurodollar Deposits and GNMAs (government backed mortgages).

4. Foreign Currency

Active futures trading of foreign currencies dates back to the 1970's. Contracts are traded on the British Pound, the Canadian Dollar, the Japanese Yen, the Swiss Franc, the West German Mark and the French Franc.

The foreign exchange futures market represents the one case of a futures market existing in the face of an active forward market.

5. Stock Index

The last group of futures contracts consists of stock indices. Beginning in 1982, these contracts have been quite successful. Four different exchanges trade contracts on six different indices: the Standard and Poor's (500, 250 and 100) and the Major Market Index, the New York Stock Exchange Index and the Value Line Index. A major distinction of these stock index contracts is that they do not allow the possibility of actual delivery. A trader's obligation must be fulfilled by a reversing trade (selling the contract before delivery) or the cash settlement at the end of trading.

F. PURPOSES OF FUTURES MARKETS

Futures markets have been recognized as meeting the needs of three groups of market users: those who wish to find information concerning futures commodities; those who wish to speculate; and those who wish to transfer risk to some other party. Futures markets help people form ideas on what futures prices will be so that they can make decisions more wisely.

A vast majority of participants in the futures markets are either speculators (risk bearers) or hedgers (risk avoiders). More than ninety-nine percent of all futures contracts are closed out by a reverse trade rather than through delivery [Ref. 3: p. 24]. Speculators and hedgers will be discussed more thoroughly in Chapter IV.

III. THE DIFFERENCES IN PRICING

A. INTRODUCTION

Having discussed the basic institutional features of the futures market in Chapter II, this chapter analyzes futures prices. The study of prices in a market is an essential key to market activity, since understanding the prices and factors that determine those prices will influence every user of the market.

An important goal of this chapter is to develop an understanding of the relationships to other observable prices, such as, futures prices and spot prices. This chapter begins by explaining the differences between futures prices and spot prices (the basis), two different futures prices of a specific commodity (the spread) and the futures price with respect to the expected future spot price. This will be followed by a discussion of the carrying charges which affects the price of the commodity. The final section is devoted to general factors which affect the prices of commodities.

B. BASIS

Futures market prices have an important relationship to other related prices. The futures price for delivery of wheat, for example, at a specific market three months from now is related to the spot price (the price at which the physical commodity is selling [Ref. 4: p. 299]) of wheat from the same market. This relationship between the futures price and spot price is called the basis. The basis is derived from a cash price of a commodity from a specific location. The cash price for wheat in Kansas City and

Chicago might differ at some point, for example, so the basis for wheat at those two locations will also differ. This difference is a result of the cost of transporting the commodity from one location to another.

At the time of delivery, the futures price and the spot price will converge towards zero. That is, the difference between these two prices becomes smaller the closer the commodity gets to delivery time. The difference in this basis is a result of the transportation costs, storage costs and financial costs. These costs will be discussed later in this chapter.

C. SPREAD

Just as in the relationship between each futures prices and the spot price of a commodity are important, the relationships among futures prices for the same good (same type of contract) are also important. The difference between the prices of two futures contracts, identical except for the date of delivery, is called the spread [Ref. 3: p. 20]. Spreads indicate the relative price differential for a commodity to be delivered at two different points in time. Let's say, for example, that the futures price for May wheat on 30 March is $3.26/bu and the futures price for September wheat, on the same day is $3.52/bu. The difference of $.30/bu is the spread.

The spread between futures prices reveals information concerning the expected futures prices of commodities. If the more distant futures contracts are higher in price than the near contracts, the market is indicating that prices will be rising. By the same token, when more distant futures contracts are lower in price than near contracts, the market believes that prices will be falling.

Spreads are very rarely above the full carrying charges and then very briefly. The reason for this is the power of arbitrage. Arbitrage is the simultaneous purchase of a futures contract in one market against the sale of the same type of futures contract in a different market to profit from the differences in price [Ref. 4: p. 294]. If a more distant futures contract stood above the nearer contract by more than the known costs of carrying, anyone could make a riskless profit by buying the nearby contract while selling the more distant contract and arranging a loan for the necessary funds [Ref. 5: p. 25].

D. FUTURES PRICES AND EXPECTED SPOT PRICES

In studying a futures market, one would expect that there is an important relationship between futures prices and the expected future spot prices. Since futures contracts call for delivery of some commodity at a particular time in the future, there is no doubt that futures prices are determined by the expectations of people who participate in the futures market. So strong is this relationship between futures prices and expected future spot prices that some people believe that the two are equal.

A simple example to illustrate this relationship might be helpful. If the futures price for wheat six months from now is $2.86 per bushel, then the expected future spot price will be approximately the same because both prices are determined by how much the market participants are willing to pay.

As simple as this view is, it does not take into acount the carrying charges associated with the purchase of commodities. The following section will discuss these costs.

E. NORMAL BACKWARDATION

The issue of market bias has attracted much attention since Keynes first proposed his theory of normal backwardation in 1927. Keynes argued that the futures prices were downward-biased estimates of the final expiration values, the bias representing the risk premium for speculators. Since then, considerable effort has been devoted to trying to find this risk premium, with mixed success. [Ref. 6: p. 75]

The underlying concept of Keynes's theory is based on the assumption that futures prices are biased downward. A test for bias is concerned with whether, as time passes, futures price rise to meet the spot price or whether the spot price falls to meet the futures price. (These prices must be nearly equal when futures contracts expires.) The test must be inaccurate because both spot and futures prices move considerably even as they converge. Spot and futures prices do not show any systematic pattern to rise as futures contracts approach expiration. [Ref. 5: p. 84]

The volatility of spreads is also damaging to the theory of "normal backwardation". According to Keynes, volatile spreads should impair futures markets. The system of futures trading as price insurance is based on the parallel movement of spot and futures prices. The more parallel the movement, the better is the insurance and the more dealers want to short hedge. Volatile spreads imply that spot and futures prices do not move in parallel. Far from being inactive when spreads are volatile and price insurance poor, that is precisely when futures markets are robust. [Ref. 5: p. 88]

F. CARRYING CHARGES

Expectations regarding future spot prices play an important role in determining futures prices. Another important factor in determining futures prices is carrying charges. Carrying charges are costs associated with storing commodities from one point in time to another. Carrying charges fall into three categories: storage costs, transportation costs and financial costs.

1. Storage Costs

Storage costs include the cost of warehousing the commodity. The storage of a commodity must be in a warehouse approved by the exchange. This is important since the futures exchanges will only accept warehouse receipts from an approved warehouse. Delivery against a futures contract is accomplished by transferring the ownership of the commodity in an approved warehouse. This is done by signing over to the buyer the warehouse receipt for the commodity.

In addition to the actual cost of warehousing the commodity, storage costs also include insurance costs. Since many commodities are stored in warehouses awaiting delivery of sale, the seller should protect them against possible damage, and theft.

2. Transportation Costs

Carrying charges also include transportation costs. Wheat, for example, stored in Chicago must be physically carried to the appropriate place for delivery. Transportation costs can differ greatly for different commodities. The transporting cost of wheat from Kansas City to Chicago is far more expensive than the cost for delivery of Treasury Bills against a futures contract. The transporting of wheat is carried out by railroad while

that of Treasury Bills is accomplished by wire transfer which costs only a few dollars.

3. Financial Costs

One of the most significant carrying charges in the futures market is the financial cost. Up to this point, all the carrying charges considered only the charges involved in storing and transporting the commodity from one time or place to another. These carrying charges did not include the asset value of the commodity itself. The financing cost for purchase of commodities is low because anyone who wishes to finance a commodity may do so by offering the commodity itself as collateral for the loan.

All of the carrying charges just described are important because they play a crucial role in determining pricing relationships between spot and futures prices and the relationships among prices of futures contracts with different delivery dates. These carrying charges gives rise to a set of pricing rules:

- The futures price must be less than or equal to the spot price of the commodity plus the carrying charges necessary to carry that spot commodity forward to delivery. If this condition did not hold, you could then borrow funds to buy the spot commodity, sell the futures contract and then carry the commodity forward to deliver against the futures contract. This would result in a certain profit without any investment costs.

- The distant futures price must be less than or equal to the nearby futures price plus the cost of carrying the spot commodity from the nearby delivery date to the distant delivery date. If this relationship did not hold, you could buy the nearby futures contract and sell the distant contract. Then you would accept delivery on the nearby contract, and carry the commodity until the delivery of the distant contract, there by making a profit. [Ref. 3: p. 41-42]

G. GENERAL FACTORS WHICH AFFECT PRICE

In addition to the changes in supply and demand, commodity futures prices are affected by more general considerations. Of prime importance are the following:

- International news
- Weather developments
- Currency movements
- General business conditions
- Seasonal price patterns

With the government determining acreage allotments, marketing quotas, subsidies, loan levels, export programs, specific selling prices of individual goods, it has become a major factor in determining the selling prices of commodities. The government, by subsidizing the dairy farmers, control the price at which milk can be sold. If the government increases the amount of wheat it sells to Russia, wheat prices will be affected.

Commodity prices are very sensitive to news concerning the prospects of war or peace. This is particularly true of the commodities such as sugar, wool, copper, silver, platinum, coffee and cocoa. The prospect of war leads to hoarding, a greater demand for raw commodities for defense and stockpiling purposes, and the possibility that imports will be cut off or at least curtailed through either lack of available shipping space or blockade. The result is a general rush by consumers and manufacturers to get supplies quickly in order to build their inventories. The increase in demand soon causes the price level to advance.

The effects of weather conditions during the growing season affects crop yields and quality. A drought results in a decline in crop harvests and

dust storms blow away top soil and seed. Weather conditions in other countries may also be an important price making influence in our markets. The wheat crop failure of 1972 in the Soviet Union and China was a weather development. This, along with other factors, led to the 1973/74 inflation and quadrupling of grain and other prices. The 1974 U.S. corn crop was developing into the expectations of a record level so huge as to replace the used up stockpile as well as meet all export and domestic needs. Two weeks of excessive rain at the end of May and early June washed away enough of the seeded area to cut crop prospects by 10%. [Ref. 4: p. 73] On April 26, 1986, a nuclear power plant in the Ukraine, Russia's breadbasket, sent radioactive particles into the atmosphere. The following days saw severe thunderstorms in that area. The concern was how much radiation would be washed out of the sky and on the crops?

When a nation imports much more than it exports, the value of its money in international trade should tend to declines. Devaluation of a foreign currency means lower prices for commodities exported to the United States leading to lower U.S. futures prices. This means, however, higher prices within the country whose currency is devalued.

Over the long run, general business conditions play a major role in commodity prices. If economic activity is running at a high rate, if business conditions are good, if unemployment is low, and inflationary tendencies are still intact, a given set of supply and demand conditions will tend to find commodity prices moving upward. If business activity is just the opposite,however, then the very same supply and demand conditions would lead to the consumption of commodities at a somewhat lower price

level. Whether we are in an inflationary, or deflationary period, business conditions must be taken into account.

In addition to the general trend of prices, each commodity usually follows a certain price pattern of its own during the various seasons of the year. In farm crops, the period during the harvest is usually one of the declining prices. This is because consumers often delay buying, thereby reducing demand, and waiting for the anticipated flood of new crop offers. On the other hand, farmers must sell at least part of their crops immediately to get enough cash to pay for the added farm labor and machinery hired for the harvest. Supply offered on the market tends to be heaviest during the harvest and the early post-harvest period. There is then a combination of decreased demand and heavy supplies. This usually tends to depress prices around harvest time each year. Once the harvest has passed, and the crop not to be sold immediately is moved into storage, a new rise in demand tends to raise prices until this demand is filled. [Ref. 4: p. 72]

IV. RISK WITHIN THE MARKET

A. INTRODUCTION

The preceeding chapters have given a general background of the history and pricing in the commodity markets. This chapter will take the prior discussions and build upon them.

The first section will discuss the effects of storing inventory. Why is it done and by whom? Following this will be a brief overview of risk transferring. This will lead into the two basic players in the market, hedgers and speculators. Why they play and what purpose they have will be discussed.

B. STORAGE AND HOLDING OF INVENTORY

Two facts about commodity markets appear constantly. First, spreads between futures prices rarely cover the known carrying costs of storing commodities. Second, firms that handle commodities always keep some in storage, adjusting the quantity to the extent that the spreads fall below full carrying charges. Together, these two facts address a central question about the pattern of prices found in future markets. Why do profit seeking firms regularly hold stocks when it is expensive for them to do so?

The answer is, firms hold stocks of physical commodities for much the same reasons they hold money. It is difficult and expensive to transport commodities to where they are needed and as a result firms will hold commodities despite spreads below full carrying charges. To keep their processing plants running smoothly , firms will pay to hold inventory.

Commodities can be stored by producers, consumers, middlemen, or merchants. They will be stored if their convenience yield (which measures the advantage to the stockholder of the immediate availability of the commodity compared to holding cash and buying the commodity when required [Ref. 7: p. 178]) exceeds their carrying cost, and the agent with the comparative advantage in carrying stocks will be the one for whom this is the greatest. If the convenience yield is sufficiently large, it may offset carrying costs, and thus eliminate any bias in futures markets. [Ref. 7: p. 197]

The easier it is to carry, or hold, an asset over time, the more marketable and thereby the more liquid it becomes. The low cost of carrying an asset over time encourages commercial firms to hold inventories. The ability to hold inventories is useful to the firm, as well as, to its market.

A commercial firm seeking to improve its profits may wish to hold inventories for three reasons:

- To improve its ability to sell what its customers seek to buy;without inventories, sales and therefore also profits would probably be lower.
- Inventories held for a relatively long period, three to four months rather than three to four days, improves an asset's marketability. The extension of a market over time allows for an increase of information about that asset. By lengthening the period an asset is carried, the benefits from increased marketability is expected to outweigh the expected cost of the longer carrying period.
- A commercial firm's holding of inventories, may also increase the return that it expects to realize, not only because of the assets increased marketability but also because the asset's price may improve over time. [Ref. 8: p. 20]

Holding inventory was originally carried out by commercial firms (dealers as well as producers). Later, speculators acquired goods for

storage in the hope of realizing higher prices. Both commercial firms and speculators earn a return from buying commodities and holding them off the market at times when supplies are abundant and prices are low, and placing them on the market later when relative scarcity raises the price. The holding of inventories by speculators also strengthens the liquidity of spot markets not only through its price-stabilizing effects but also by increasing the number of market participants. [Ref. 8: p. 22]

The higher the risk of price uncertainty, the higher the financing costs. Both price uncertainty and financing costs work against speculative and commercial demand (hedgers) for holding inventories. Although inventories may be held with the expectation of favorable price developments, these expectations cannot be held with certainty. Speculators in inventory holdings presumably have a comparative advantage in predicting the future course of prices, but in the case with commercial demand, price uncertainty reduces speculative demand.

C. RISK TRANSFER

In the literature on forward and futures markets, there is considerable discussion on the transfer of risk from those who wish to avoid risk (commercial firms/hedgers) to those who are willing to assume risk (speculators).

In contracts for future transactions, a transfer of risk does take place in the sense that commercial firms reduce, and speculators increase, their net exposed positions. At least two factors appear to underlie the transfer of risk from commercial firms to speculators. The first is the principle of increasing risk and the second is a difference in capability of bearing risk.

The principle of increasing risk proposes that the cost of risk exposure not only increases with additions to exposure, but does so to an ever greater extent. [Ref. 9: p. 440] In practice, this principle would tend to generate a transfer of risk from commercial firms to speculators. The transfer of risk may leave commercial firms and speculators with different risk exposures, which could reflect unequal capabilities of bearing risk. There are two aspects of differences in risk-bearing capability. First, speculators are likely to have a distinct advantage in predicting future spot prices. Speculators are more likely to have better information concerning future spot prices than commercial firms. As a result, the cost of their exposed position is likely to be smaller, so that they may be willing to bear a larger risk exposures than commercial firms. Second, speculators and commercial firms will not have the same income and wealth positions. These differences may lead to differences in their ability to bear the risk, as well as their willingness to do so. [Ref. 8: p. 46]

D. HEDGING

Hedging may be defined as the establishment of a position in the futures market opposite from that held in the spot market [Ref. 4: p. 163]. The purpose of hedging is to reduce financial risk due to price fluctuations. Other reasons for hedging include:

- To facilitates buying and selling decisions. When hedging is practiced systematically, there is need only to consider whether the price at which a particular purchase or sale can be made is favorable to other current prices; there is no need to consider also whether the absolute level of the price is favorable.
- It gives greater freedom for business action . . . the freedom gained is to make a sale or purchase that would not otherwise be possible at what is judged a favorable price level, as when a cotton grower sells futures in advance of harvest, or a textile mill buys futures because cotton prices

are judged to be favorable, but the desired qualities of cotton cannot be bought immediately in the spot market.

- It gives a reliable basis for conducting storage of commodity surpluses. The warehousing of surplus commodity stocks is a very uncertain and hazardous business when based on trying to judge when price is favorable for storage; hedging allows operation on the basis simply of judgement that the spot price is low in relation to a future price.
- Hedging reduces business risks. There is usually reduction of risk when hedging is done for any of the previous three reasons (though often not under the second reason), but any curtailment of risk may be only an incidental advantage gained, not a primary or even a very important incentive. [Ref. 10 pp. 560-561]

There are two types of hedges, the short (selling) hedge and the long (buying) hedge. The short hedge is designed to protect the value of inventories against possible price decline while the long hedge is used to protect against possible price increases of the actual commodity. If after the commodities are purchased the price of the commodity should decline, there could be a substantial loss from inventory. However, because the price of the commodity declines in the spot market, the futures price of the commodity would also decline. Thus, the loss on the cash value of the commodity would be wholly or partly recovered by the profit in futures. If the price rose after the hedge had been placed in the futures market, then there would be a loss on the short hedge in futures. This loss would be compensated for by the increased price of the commodity purchased on the spot market.

The following is an example of a selling hedge. In March, a grower of wheat decides to offset his expected production in June by selling a sufficient number of July wheat futures contracts. The cash price that he expects to obtain in June is $3.50/bu. The July futures are selling for $3.65/bu in March. This example will assume that cash and futures prices

move in equal segments, or what is known as the perfect hedge. Rarely, if ever, does a perfect hedge occur. In June, the cash price of wheat is $3.35/bu and July futures are at $3.50/bu. There has been a 15 cent reduction in the expected cash price, however, it has been offset by a 15 cents/bu gain in the futures market because of the short hedge. Thus the farmer has grossed his expected price of $3.50/bu by selling his wheat in the cash market for $3.35/bu and gaining 15 cents/bu in the futures market by buying back his future contracts. Figure 4.1 shows this transaction. [Ref. 11: p. 16]

An advantage of hedging is that many futures contracts can be purchased for delivery usually in one or two months, but also as far as a year or more in advance. By purchasing futures, users can secure a fixed price for their raw materials and thus be fairly certain of their costs. Remember though, that delivery of the actual commodity need not take place. They are only used as protection against a rise in the price of the actual commodity. Should that occur, the profit in futures will offset the price increase in the actual commodity, thus ensuring raw material costs.

Futures contracts are used as one part of the actual transaction composing a hedge to offset major price risks. Hedging fails to give complete protection against adverse price movements for several reasons:

- The spot price of the commodity and the price of various futures delivery months do not necessarily advance or decline together by exactly the same amount. There are premiums and discounts between the various futures months, and these tend to change over a period of time. Since the price differences between various futures months change, then some of these delivery months are not moving exactly with the price of the spot commodity.

- The prices of the different grades in the spot market change at different rates. Sometimes one grade will sell at a smaller discount to another, sometimes at a wider discount. The futures market cannot exactly reflect the price changes of all the different grades because a futures contract is traded in terms of one basic grade. A person may be hedging a grade of the commodity that is moving up or down in the spot market a little faster or a little slower than the futures.

- The size of the futures contract unit is fixed. A unit, or multiples thereof, may not precisely cover the quantity involved in a spot market transaction. Therefore, a price change in futures may not exactly reflect the change in value of the dealer's or processor's inventory.

- A hedge may be against a product other than the commodity traded in futures. For example, flour inventories may be hedged in wheat futures, or cotton yarn in raw cotton futures. The price of futures, therefore, may fluctuate in a manner different from that of the product hedged. [Ref. 4: p. 175]

CASH	FUTURES	BASIS
March 15 Objective is $3.35/bu	Sells July wheat Futures at $3.65/bu	$0.15 under
June 15 Sells wheat at $3.35/bu	Buys July wheat Futures at $3.50/bu	$0.15 under
Results $0.15/bu less than price objective	Gain $0.15/bu	Change $0.00

Cash price received for wheat	$3.35/bu
Gain on futures contracts	.15/bu
Gross Price Received	$3.50/bu

Figure 4.1 Example of a Perfect Hedge

D. SPECULATING

Commercial firms use futures markets to hedge by limiting or offsetting price risks. In order for this to take place, there must be some group willing to take on these risks. It is the speculator who takes these risks. In doing so, the speculator hopes that the market will move as he has anticipated resulting in a profit in exchange for his risk-taking.

A speculator can be defined as one who engages in futures transactions with the sole purpose of profiting from price fluctuations [Ref. 12: p. 27], and by doing so, willingly increases his risk exposure. While the speculator is motivated solely by profit, his behavior provides liquidity to the marketplace and thereby leveling off most of the peaks and valleys that would otherwise occur in the price structure. Succinctly put, speculators supply needed risk capital, increase the volume of trade and keep the various markets in alignment through arbitrage operations. [Ref 4: p. 263]

Since the commodity futures markets are designed primarily to meet the hedging needs of the business community, many people fail to understand the necessity of permitting and encouraging speculative trading. Extensive speculative activity is necessary for the smooth flow of commodity futures transactions.

There are three types of speculators: scalpers, day traders and position traders. These speculators are categorized by the length of time they plan to hold a position.

Of all the speculators, scalpers hold the shortest position in the market. Scalpers try to anticipate movement in the market over a very short interval, usually ranging from a few seconds to a few minutes. In order to do this, they must be in the "pits", since their holding period is so short.

Scalpers do not expect to make big profits since their holding period is so short. Scalpers, do however, provide a valuable service to the market. By making so many trades, scalpers help supply the market with high liquidity. Their trading activity increases the ease with which other participants may find trading partners.

The second type of speculator, day traders, attempt to profit from the price movements that may take place over the course of a trading day. The day trader will close his position prior to the end of each trading day so that he has no contracts held overnight. Day traders believe that it is too risky to hold a speculative position overnight because developments which occur overnight can lead to higher or lower prices tomorrow.

The third type of speculator, position traders, hold their positions for a period of time varying from overnight to several months. There are two classifications of position traders, those holding outright positions and those holding spread positions.

An outright position trader can best be described by an example. If an outright position trader believed that long term interest rates were going to rise more than the market expected over the next two months, then as interest rates rise unexpectedly the future prices of bonds must fall. The outright trader would sell future contracts for U.S. Treasury bonds and hold that position over the next two months. If the trader is correct, there will be a sharp rise in rates not correctly anticipated by the market, and futures prices will fall. The trader can then cover his position by executing a reversing trade and reap the profits. [Ref. 3: p. 60] The outright position trader has a chance for very large gains, if correct, but also carries the

risk of a very large loss. For most speculators, the risks associated with outright positions are too large.

The more risk-averse position trader who trades a spread is called a spread position trader. In trading a spread, one trades two contracts that are believed to be related in their price movements and tries to profit from changes in their relative prices. A spread position is initiated because a trader believes that the difference in price between two commodities is going to increase. The trader does not have to worry if the prices were going to rise or fall but only about the relative price performance of the two commodities.

V. MARKET PERFORMANCE

A. INTRODUCTION

This study, up to this point, has discussed the different functions of the futures market and how they affect market performance. With this in mind, Chapter V will analyze the market performance of winter wheat traded on the Kansas City Board of Trade during the period of 31 January 1982 through 20 April 1986.

This chapter, will then analyze the wheat futures market for the period of 28 April to 20 May 1986. In some depth, this analysis will center around the nuclear accident at Chernobyl, in the Ukraine, and its effect on the wheat futures.

B. PERFORMANCE OF THE MARKET

More than one-fifth of the world's cropland is devoted to wheat and yields 28% of the world's total grain production. The United States is the leading exporter. [Ref. 13: p.1] Winter wheat acounts for almost three-fourths of U.S. total production. [Ref. 4: p.87]

Wheat futures and spot price fluctuations proved to be the most difficult of the commodities to explain. Wheat is not normally competitive with any other grain, consequently wheat prices cannot be explained by the prices of other grains. Wheat is an extremely important crop that fits the description of a seasonally renewable commodity with long term storage characteristics.

The harvest of winter wheat begins in late May and continues through mid-July. In addition to this wheat harvest in the United States, Argentina and Australia have oppposite harvest times so wheat is continually coming into the market.

In spite of this continuous supply of wheat, the seasonality factor in the availability of wheat is very strong. The United States Department of Agriculture defines the wheat crop year as running from 1 June to 31 May. In June, the carry over from the preceeding harvest is nearly depleted, but the new harvest is just becoming available. The stock of wheat continues to grow over the harvest period until reaching its greatest level usually in October and begins to decline again.

The data used to analyze winter wheat were limited to the Kansas City Board of Trade Futures Exchange for the period 31 January 1982 to 30 April 1986. These data represent only the last day of trading for the particular month and includes the spot price, as well as the futures prices for March, May, July, September and December contracts. These data, which are the basis of the analysis, is shown in Table II. All other tables and figures, in this chapter, are from the data provided by this table.

Looking at Table II, it can be observed that out of all the relevant futures prices, sixty-one percent have decreased compared to the previous month while thirty-seven percent showed an increase and about one percent stayed the same. The months of March and December were the only two months that showed an overall increase in futures prices. March had an increase of seventy-five percent while December had a one month net increase. At this time, no reason can be found to explain these increases. The remaining months all showed a net decrease in futures prices.

TABLE II

WHEAT (KCBT) FUTURES AND SPOT PRICES FROM JAN 82-APR 86

	1/29/82	2/26/82	3/31/82	4/30/82	5/30/82	6/30/82
SPOT PRICE	4.295	4.2	4.2325	4.2525	4.0675	3.815
MAR 82	415	401.5				
MAY 82	406	395	397.25	401.75		
JUL 82	406.5	392.75	393	394.25	365.25	362
SEP 82	416.25	403.5	403.5	403.5	373	363.5
DEC 82	434	421.5	418	419.75	391	379.5
MAR 83				433	406	393.75
MAY 83						394.5

	7/30/82	8/31/82	9/30/82	10/29/82	11/30/82	12/30/82
SPOT PRICE	3.69	3.78	3.6925	3.6575	3.9575	3.9875
SEP 82	361.5	370				
DEC 82	382	381.5	371.75	352.25	379.25	
MAR 83	396.5	392	379.5	352	374.25	378.25
MAY 83	399	393.5	377	351.5	368.5	372.5
JUL 83	396.25	392	376	351.5	368.25	366.6
SEP 83				360	373	374

	1/31/83	2/28/83	3/31/83	4/29/83	5/31/83	6/30/83
SPOT PRICE	4.035	4.105	4.22	4.1625	4.005	3.8075
MAR 83	384	393				
MAY 83	374.5	378	398.5	351.25		
JUL 83	374.5	367.25	387	361.5	359	361.25
SEP 83	376	374	393.75	370.5	363	361.75
DEC 83	390	385	406	384	373.5	371
MAR 84			411	395	381.5	376
MAY 84				399	381.5	376.5
JUL 84						366.75

TABLE II (CONTINUED)

	7/29/83	8/31/83	9/30/83	10/31/83	11/30/83	12/30/83
SPOT PRICE	3.795	3.99	3.795	3.79	3.8025	3.8425
SEP 83	369	395.5				
DEC 83	381.25	410.75	383	373.5	368.75	
MAR 84	388.75	421	392.25	373	368.25	372.75
MAY 84	389	424.5	394	366.5	364.25	365
JUL 84	377.25	410	382	354.5	352.25	351.75
SEP 84			388	360	356	359

	1/31/84	2/29/84	3/30/84	4/30/84	5/31/84	6/29/84
SPOT PRICE	3.7425	3.755	3.925	3.8675	3.86	3.735
MAR 84	363.75	365				
MAY 84	356.25	356	378	374.25		
JUL 84	345	343.25	365.5	360.25	365.5	367
SEP 84	350.5	345.5	369	363.25	371.5	373.5
DEC 84	362.25	357.25	382.75	374.5	383.5	384
MAR 85				387	392.5	391.5
MAY 85						394.75

	7/31/84	8/31/84	9/28/84	10/31/84	11/30/84	12/31/84
SPOT PRICE	3.6975	3.8875	3.825	3.865	3.82	Z (3.785)
SEP 84	362.25	374.25				
DEC 84	373.5	367.75	370.75	376	367.5	
MAR 85	379.5	366	369.75	380	365.5	354
MAY 85	380	362	358.75	374	359.5	346.75
JUL 85	371	350.5	347	354	346.25	341.25
SEP 85			353.5	355.5	351.5	345.75

TABLE II (CONTINUED)

	1/31/85	2/28/85	3/29/85	4/30/85	5/31/85	6/28/85
SPOT PRICE	3.7325	3.635	3.715	3.6425	3.36	3.2075
MAR 85	351.75	349				
MAY 85	343.75	340.5	350	343.75		
JUL 85	335.75	329.5	337.25	328.25	315.5	314.25
SEP 85	339	334	338.25	329.5	318	318.5
DEC 85		342.75	347.75	339	328	324.5
MAR 86				343	332	324
MAY 86						317
JUL 86						300

	7/31/85	8/30/85	9/30/85	10/31/85	11/29/85	12/31/85
SPOT PRICE	3.07	2.995	3.0625	3.3025	3.2975	na
SEP 85	297.5	291.5				
DEC 85	302.5	301.75	309.75	323.75	325.25	
MAR 86	301	301	311.25	327.25	328.5	336
MAY 86	289.5	290	297	313.5	311	318.25
JUL 86	272.5	271	285.5	293	288	286
SEP 86						287.5

	1/31/86	2/28/86	3/31/86	4/30/86
SPOT PRICE	3.255	3.5125	3.34	3.745
MAR 86	316	324		
MAY 86	278.75	277	281.5	300.25
JUL 86	269	251.5	246.75	285
SEP 86	272	255	248.5	289
DEC 86		266	257	295.5
MAR 87				300

An analysis of the performance of wheat should reveal a seasonal pattern to cash wheat prices. Other things being equal, wheat prices should tend to be higher prior to harvest and lower just following the harvest. As illustrated in Table III, the three most frequent months in which the highest cash/spot prices for the year occurred during the period from 1982-1985 for winter wheat were January, March and April. The lowest cash/ spot prices, for the same period, occurred in July, September and October. It should be mentioned that, on the average, during the harvest period, the spot price declined each month. After the harvest, the spot price showed an increasing trend until the next harvest period. This can be seen in Table IV, which shows the average spot prices of each month. These results confirm the view that cash prices should be higher when inventories are low and that prices should be lower when inventories are high.

TABLE III

THE 3 MOST FREQUENT MONTHS IN WHICH HIGH AND LOW CASH/SPOT PRICES FOR THE YEAR OCCURRED, 1982-1985. DATA ARE FOR CALENDER YEARS FOR #2 WINTER WHEAT (KCBT).

MONTHS	NUMBER OF HIGHS	NUMBER OF LOWS
JANUARY	2	1
FEBRUARY	1	0
MARCH	4	0
APRIL	4	0
MAY	0	0
JUNE	0	1
JULY	0	4
AUGUST	1	1
SEPTEMBER	0	3
OCTOBER	0	2
NOVEMBER	0	0
DECEMBER	0	0

TABLE IV

AVERAGE CASH/SPOT PRICES BY MONTH FROM JANUARY 1982-APRIL 1986

JANUARY	381.2	MAY	382.31	SEPTEMBER	359.38
FEBRUARY	384.15	JUNE	364.13	OCTOBER	365.38
MARCH	388.65	JULY	356.31	NOVEMBER	371.94
APRIL	393.4	AUGUST	366.31	DECEMBER	372.63

Table V shows the distribution of the three highest and lowest winter wheat futures months for the May contracts on the Kansas City Board of Trade. Covering the period from April 1982 to April 1986, These data point out a couple of things worth mentioning. First, many of the extreme high prices are found in the three months following May which is not surprising considering that the contract will not mature for almost a year. Second, three out of four months with the lowest wheat futures prices are December, January and February. This is surprising since the prices should be lower in the months immediately preceeding the delivery month. The most probable reason for this phenomenon is that wheat from south of the equator hit the market around this time.

C. RECENT DEVELOPMENT

On April 26, 1986, in the northern part of the Ukraine, a nuclear reactor in Chernobyl caught fire. As a result of this fire, a radioactive cloud was sent skyward over the Ukraine. This accident could not have happened at a worse time. With a little more than a month left before beginning their wheat harvest, 21% of Russia's total wheat production could be contaminated.

TABLE V

THE 3 MOST FREQUENT MONTHS IN WHICH HIGH AND LOW FUTURES PRICES FOR THE YEAR OCCURRED, 1982-1986. DATA ARE FOR CROP YEARS FOR #2 WINTER WHEAT (KCBT).

MONTHS	NUMBER OF HIGHS	NUMBER OF LOWS
JANUARY	0	3
FEBRUARY	0	3
MARCH	1	1
APRIL	0	2
MAY	0	0
JUNE	3	0
JULY	3	0
AUGUST	1	0
SEPTEMBER	1	0
OCTOBER	2	1
NOVEMBER	0	1
DECEMBER	1	1

It was not until three days later, April 29th, that information concerning this accident reached the futures markets in the United States. Initial information received about the nuclear accident was sparse, sending U. S. agricultural commodity futures soaring in hectic trading. The hectic trading was fueled by uncertainty over the extent of the damage from the nuclear power plant. This uncertainty prompted many traders who previously sold futures to buy back the contracts and bail out of the market. The buying rush drove wheat prices up to the maximum daily limit before settling back down for a significant gain. [Ref. 14: p. 40]

The following day, the market picked up from where it left off, sending wheat prices again to maximum limits. News concerning the weather in the

area of the nuclear accident sent prices soaring. With thunderstorms reported across the Ukraine, the major concern was whether the rain would wash radiation out of the atmosphere and contaminate the wheat crop.

The following is a list of articles that appeared in the commodity section of the Wall Street Journal on the dates indicated following the nuclear accident. The dates of these articles reflect the previous day's trading.

- 30 April 1986 - "Agricultural Prices Soar on Uncertainty Over Damage From Soviet Nuclear Plant"
- 1 May 1986 - "Farm Contracts Climb as Fear Mounts That Accident Endangers Soviet Crops"
- 2 May 1986 - "Farm Contracts Fall on Report of Easing Of Radiation From Soviet Nuclear Plant"
- 6 May 1986 - "Grain Prices Rise Amid Concerns On Soviet Accident"
- 9 MAY 1986- "Agricultural Contracts Rise on Reports Moscow Is Seeking to Buy Food in Europe"
- 14 May 1986-"New Speculation On Soviet Accident Roils Farm Prices"
- 16 May 1986-"Grain Contracts Tumble on Assertions Soviets Won't Need to Increase Imports"

Table VI gives all the futures prices as well as the spot prices for winter wheat (KCBT) from 28 April to 20 May 1986. This table depicts the changes in the spot prices, as well as May and July wheat futures prices.

The graph in Figure 5-1 shows what reaction to the news, involving the nuclear power plant accident at Chernobyl, had on the futures market from April 28 to May 20th. Figure 5-1 was extracted from the information provided by Table VI. This graph depicts only spot prices and May and July wheat futures prices from the Kansas City Board of Trade for the period

TABLE VI

RESULT OF CHERNOBYL'S NUCLEAR ACCIDENT

(KCBT)	4/28/86	4/29/86	4/30/86	5/1/86	5/2/86	5/5/86
SPOT	354.75	361.5	374.5	347.75	336.5	337.25
MAY 86	266.25	275.25	300.25	280.5	272.25	276.5
JUL 86	249.25	260	285	268.25	257	258
SEP 86	251.5	264	289	270.75	260	260.5
DEC 86	258.25	270.5	295.5	280	269	270
MAR 87	260.25	275	300	283	275	276
SPOT	3.60%	3.47%	-7.69%	-3.34%	0.22%	1.96%
MAY	3.27%	8.33%	-7.04%	-3.03%	1.54%	3.99%
JUL	4.13%	8.77%	-6.24%	-4.38%	0.39%	2.46%

	5/6/86	5/7/86	5/8/86	5/9/86	5/12/86	5/13/86
SPOT	344	346.75	369.25	373.75	364	373.5
MAY 86	288	292.5	312	315	310	330
JUL 86	264.5	262.25	281.75	279.25	269.5	279
SEP 86	268	264	285	283	271	281.75
DEC 86	277	273.5	293	291	279	290.25
MAR 87	279.5	277.5	297	295	283	291
SPOT	0.74%	6.09%	1.20%	-2.68%	2.54%	-0.61%
MAY	1.44%	6.25%	0.95%	-1.61%	6.06%	4.21%
JUL	-0.80%	6.92%	-0.90%	-3.62%	3.41%	-0.81%

	5/14/86	5/15/86	5/16/86	5/19/86	5/20/86
SPOT	371.25	359.25	345.25	340.5	329.25
MAY 86	344.5	334.25	319.75	324	322
JUL 86	276.75	264.75	260.75	256	251.75
SEP 86	278.25	266	261.75	257.75	253
DEC 86	288	274.75	270.5	267	262.5
MAR 87	292	279	274.5	270	265
SPOT	-3.34%	-4.06%	-1.40%	-3.42%	
MAY	-3.07%	-4.53%	1.31%	-0.62%	
JUL	-4.53%	-1.53%	-1.86%	-1.69%	

mentioned. Increases and decreases in spot and futures prices on this graph are a result of the adverse news. This illustrates just how volatile the commodity futures market is to outside influences, as seen by this accident.

This accident confirms the belief that spot and futures prices react to many different things. As seen, international news and weather developments sent the market into a hectic session. Many outside influences can not be controlled or predicted which results in a very volatile market.

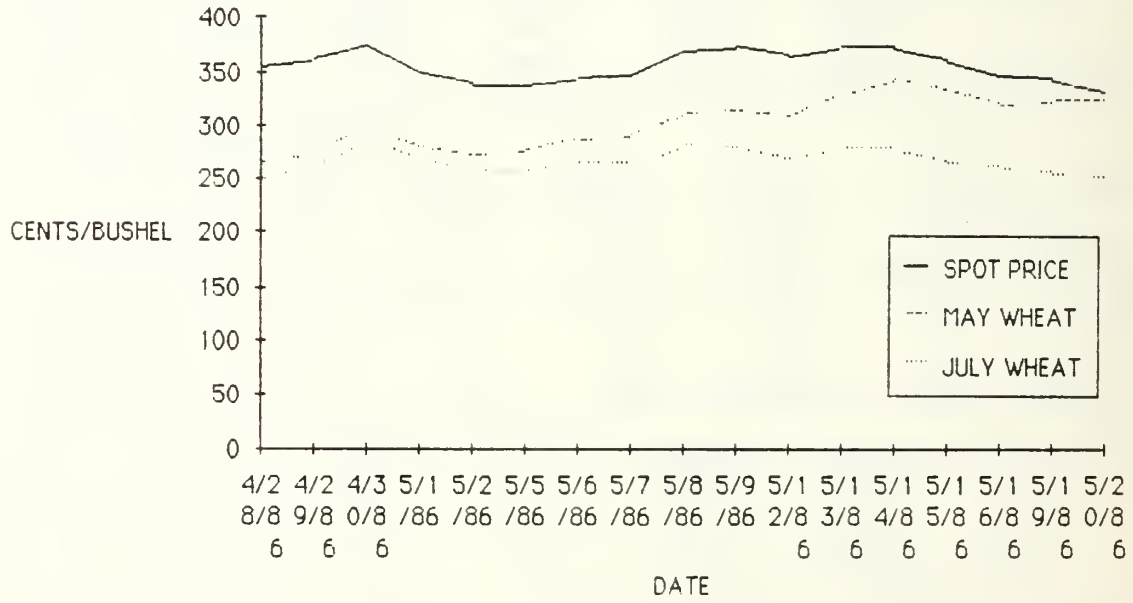

FIGURE 5-1: SPOT, MAY AND JULY WINTER WHEAT (KCBT) PRICES FROM 28 APR-20 MAY, 1986

VI. SUMMARY AND CONCLUSIONS

A. SUMMARY

The intent of this study was, first, to discuss the major functions of the commodity futures market and how they affect the market's performance. Some of these functions were used in the analysis of performance of the winter wheat crop on the Kansas City Board of Trade.

The history of the futures market explored the origins of the market, describing how trading was accomplished prior to the establishment of futures markets. During the early period, many problems were encountered by these traders as a result of poor transportation and communications. These are two of the main reasons why a formal futures exchange was not established until 1848. Prior to this time many of the markets were unorganized markets called forward markets. This changed, for the majority of commodity markets, to futures markets around 1860. There are still forward markets used today. The key word to describe the difference between these two markets is standardization. Futures markets have standardize contracts while forward markets are more tailor-made to the needed of individual traders. The types of futures contracts are agricultural, metallurgical, interest earning, foreign currency and stock indices.

Next this study turned toward the pricing structure of the markets. This is essential since understanding the prices and factors that determine those prices will influence every aspect of the markets. The basis and spread give traders basic information concerning the relationships between futures and

spot prices, and between two futures prices for the same commodity for delivery at different times.

Futures prices and expected spot prices were then discussed. This led to the theory of normal backwardation. Basically this theory proposes that futures prices move toward the spot price. However, there has been research on this theory that questions its underlying principle of futures prices being bias.

Once a commodity has been purchased, there are certain changes associated with the commodity. There are storage, transportation and finance costs.

Prices of the commodities are affected by many factors. As seen in Chapter V, the price of wheat, as a result of the nuclear accident in Russia, was affected by international news and weather developments. Some other areas which affect the price of a commodity are exchange rates, general business conditions and seasonal patterns.

Since the price of a commodity may be very volatile over time, risk plays a big part in terms of the transaction in the commodity. Once the commodity is bought, the trader needs to know whether he should store the commodity until he can use it or whether he should he hedge against his purchase. When a trader hedges against his purchase he is, in simplistic form, selling another contract opposite to his purchase. The trader will sell this contract to someone known as a speculator. It is the speculator who then accepts the risk that the trader was not willing to bear. For this, the speculator anticipates that the market will move in his direction.

There are three types of speculators, scalpers, day traders and position traders. They are categorized by the length they plan to hold their position.

Once a basic knowledge of the commodity futures markets has been understood, this study then analyzes the winter wheat crop from the Kansas City Board of Trade. The data used covers the period from 31 January 1982 through 30 April 1986. Only the data from the last day of each month was used. Trends in the spot and futures prices, as well as variations, were investigated.

Then the analysis turned to a recent development. On April 26, 1986, in the northern section of the Ukraine, a nuclear reactor released radioactive particles. The particles were dispursed into the atmosphere. The concern here was how much the radioactivity damaged Russia's winter wheat. The analysis was centered over the period 28 April 1986 through 20 May 1986. Data from these days will be analyzed to observe trends and variations.

B. CONCLUSIONS

This study has explored some fundamental principles concerning the development of the commodity futures market. The market, because of its volatity is, overall, extremely risky. More traders have lost money in the commodity futures than have gained. This should not detract a trader away from the market. The trader should fully understand the market organization and the causes of price movements before entering into a contract. With a thorough understanding, a trader could make a substantial profit from his transactions.

The future market organization not only permits a transfer of risk but also results in less total risk to society. Resulting from the reduced risk in the aggregate, larger amounts of production and inventory carryover are undertaken.

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